A Mission View of Aviation Wx Requirements

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A Mission View of Aviation Weather Requirements

• Ketchup & Mustard – but with the entire burger
• DSTs and Weather Requirements
• The Pilot’s View
  – Steve Hofmann, JPDO net-centric advisor
• Data Sharing
NextGen Wx Integration Concept

- Met Community
- Observations
  - Reports
  - Sensors
- Collect data
- Analyze data
- Forecast data

NextGen Virtual Wx Repository
- Direct External Users
- Primary: NWS
- Secondary: FAA, DOD, Private

Research Community & Components
- Weather Translation:
  - Translation to Aviation Constraints
  - *Translation of weather data & other components into characterization of potential NAS constraints
- ATM Impact Conversion:
  - Conversion to Operational NAS Impact
  - **Conversion of potential NAS constraint into specific NAS impact(s)**

ATM Community
- ATM Aviation Standards
- ATM Efficiency Demand/Capacity
- ATM Decision Support
  - ***Impact Mitigation Options

ATM Performance
- State of the NAS
- Standards/Regulations
- ATM Capabilities

ATM-ATM, DOD-MET, Private

Not weather centric!
ATM Capacity & Performance

• Capacity = Demand – Wx – Special Use – Outages – …
• ANSP goal: optimal ground, airport, sector and NAS performance after constraints are mitigated
  – Weather and weather translation not alone in CDM
  – Weather translation should be integral to guidance tools (e.g., Flight Schedule Monitor (FSM), 3D Path Arrival Management, Route Availability Planning Tool) … but weather’s inclusion is from nothing to “all in”

Can this affect how requirements are developed?
ATM Wx Requirements - Drivers

- **ATM performance need**: maximize remaining capacity while changing the uncontrollable to controllable
- **Example Decision Support Tool: FSM**
  - Purpose: common awareness of current and future demand vs capacity
  - Model and issue TMIs including GDPs, GSs, AFPs
  - Major functions (e.g., Rationing by Schedule, Ground Stop, AFP)

**Operators and Ops Research should consider:**

- Which functions should include what types of weather information and/or thresholds?
- What is the sensitivity of the function’s algorithm(s) to the input weather data?
- Does wx info (of a certain accuracy) improve FSM’s guidance?
ATC/Dispatch Example

- Weather support for managing terminal activities: surface movement guidance
  - Present and forecast weather
  - Surface conditions
  - De-icing activities
  - Convection at and near the terminal

Information contributes (e.g.) to taxi occupancy time before entering the departure queue ... meet agreed-upon time performance for departing the terminal.

Is weather in NASA’s Surface TBO and Precision Departure tools? Are there plans to link to terminal configuration guidance tools? -- just things to think about
ATM Wx Requirements - Considerations

• What weather information does the DST need?
  – Should help establish operational priorities
  – Build in thresholds: below some value $X$, I don’t care

• How accurate does that information have to be to generate DST output that optimizes performance?
  – If I’m off by RMS%, DST’s guidance doesn’t significantly change

• How mature is the DST? What more do I need to make a decision? … CDM WET and CDM

• Plus one more: what does the pilot/operator need?
ATC’s Customer – The Pilot

From Digital Aeronautical Information Vision

Maj Kendall “Vader” Gillespie / HQ AFFSA A3ON / CNS/ATM Div
Today’s User Tools

Jeppesen FlightStar
- TACs, winds, radar, more
- Planning to landing

Ops Research opportunity
Forecast vs experienced wx elements: what’s the delta or tolerance for safe TBO? (surface/climb/enroute/descent)
Autonomous / Customized Info for Mission / Platform

From Digital Aeronautical Information Vision

Maj Kendall “Vader” Gillespie / HQ AFFSA A3ON / CNS/ATM Div
Shared Information Environment

**GOVERNANCE:**
NextGen Information Sharing Agreement (NISA)

**OPERATIONAL:**
Ex: System-Wide Information Management (SWIM)

**Users Share Common Picture**
- Pilots
- Military
- Air Traffic Control
- Travelers

- Increased Safety
- Reduced Congestion
- Enhanced Planning
- Improved Operations
- Greater Efficiency
- Cut Environmental Impact

NextGen Partners
- FAA
- DoD
- DHS
- DOC
- NASA

Shared Services
- Weather
- Aeronautical
- Flight
- Comm.
- Surveillance

NETE
TEST
Deploy
VALIDATE
Users with Common Needs
Span Domain, Mission, and Operational Improvement

- Increased Safety
- Reduced Congestion
- Enhanced Planning

- Improved Operations
- Greater Efficiency
- Reduced Environmental Impact

One Common Picture

Tailored information matched to need

Military
Controllers
Pilots
Travelers